SYSTEMS AND DATA/METADATA STANDARDS FOR BLAISE III

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ABSTRACT

Blaise III is an integrated system for developing and administering computer assisted telephone interview (CATI) surveys. System standards and data/metadata/output standards are evolving around the requirements of the Blaise III system and the benefits of fully utilizing the capabilities of the Blaise III system.

The system standards focus on hardware requirements, user interface design, and monitoring methods. The hardware elements include the computer station, the telephone at the station, the fax station, and the telephone system. Issues related to performance, security, and quality control contribute to the system standards. The evolving standard user interface for Blaise III interview programs includes keyboard and mouse control, visual cues for interviewers, question placement, and selection of keys for functions. The methods for monitoring interviews to be discussed will encompass all phases of the survey cycle, from training to interviewing. The Blaise III system provides several tools for the interviewer supervisor to monitor the progress of the interview.

A discussion of data base structure development for surveys will focus on the impact of data base structure on the survey programmers, supervisors, quality control staff, and interviewers. Methods for designing the questionnaire data base structures will be described in detail. The evolving Blaise III metadata standards including topics such as data structures, question texts, answer sets, data dictionaries, and data models will be presented. The focus of the discussion will be on using metadata information to improve the quality of the survey. Finally, standard output requirements of a survey will be presented and discussed. Topics include exporting data to analysis tools, data base structure setup, exporting question and answer set text, data dictionaries, and a tabular checklist of output deliverables.

KEYWORDS

Computer-assisted telephone interviewing, Blaise III, metadata standards, system standards

Introduction

Blaise III is an integrated system for developing, administering, and post-processing computer assisted telephone interview (CATI) surveys. The Blaise III system contains environments for developing source code, viewing data, administering interviews, and generating metadata documentation. The run-time environment contains a call scheduler available to interviewers and supervisors. Also, supervisors have access to statistics regarding the status of the survey at any moment. System standards and data/metadata/output standards are evolving around the requirements of the Blaise III system and the benefits of fully utilizing the capabilities of the Blaise III system.

System standards revolve around computer hardware, telephone equipment, fax equipment, and monitoring hardware and software. Data standards consist of database design and survey design

techniques. Output standards relate to the data and documentation that is delivered to the sponsor of a survey.

Survey metadata is "data about data". In the Blaise III system, metadata includes data base structure, the questions asked ("fields"), the order and logic with which they are asked ("rules"), the answer sets for the questions ("types"), validation checks on question answers ("signals"), and data dictionaries. In the Blaise III system, metadata is used by all parts of the system. Data dictionaries are created with it, "tree"-like structures showing the flow of questions are built from it, and survey data can be viewed on-line with it. All this metadata is stored in the "data model" by the Blaise III system.

Survey metadata is increasingly important because it makes the data easier to distribute to multiple users. Surveys are becoming more intricate in their structure and more complicated in their data structure as computerized systems such as Blaise III become more widely used. Without adequate information about collected survey data, other researchers will not be able to use the data effectively.

Systems standards

Hardware and Monitoring standards

The Blaise III system runs best off a local area network. This allows interviewers to access common data bases, such as the proprietary Blaise II data files and the call scheduler data files. The Blaise III call scheduler routes cases to specific interviewers over the network according to appointments that have been made and according to rules that the programmer defines and codes into the Blaise III system. Table 1 summarizes the hardware standards described below.

The computer station required for optimum use of Blaise III capabilities include a 486 processor, 8 MB of RAM, a VGA monitor, a keyboard, and a mouse. The Blaise III system allows the programmer to color code instructions on the screen. For example, prompts that are always read to a respondent can be shown in red and probes that are only used in certain situations can be shown in green. The call scheduler screen is also color sensitive. The mouse can be used to increase speed of the interview in entering data on appointment screens.

The telephone should be equipped with a headset that allows the interviewer to use both hands on the keyboard and mouse. The telephone system should ideally be equipped with "silent monitoring" equipment. This equipment allows a supervisor to listen in on the conversation between an interviewer and a respondent without the interviewer or the respondent being aware of it. In the event that a respondent returns a call to the organization that is administering a survey, the telephone system should allow those calls to be routed to specific interviewers.

A fax station should be located near the interviewers' area so that the interviewers can fax documents to respondents. In many surveys, an official letter of request is sent by the sponsoring agency to the respondents. If the respondent has not received this letter and will not proceed with the interview before the letter is received, then the interviewer can fax the letter to the respondent and the interview can proceed with minimal delay.

The interviewers' computer systems should be fast enough so that the typical tasks that the

Blaise III system performs do not slow down the progress of the interview. The performance of the computer system should be evaluated with the "silent monitoring" software operating; this software may perceptibly slow down the execution of the system.

The computer stations should not be equipped with hard disks to ensure that data and programs cannot be taken away from the interview station.

User interface standards

A standard user interface has advantages for programmers, quality control staff, and interviewers. The user interface is comprised of the "look" of the data entry screens and the "feel" of the navigation through the survey instrument. Programmers benefit from a standard user interface by reusing code that has screen formatting. Quality control staff can have the advantage of testing only one user interface paradigm. Most importantly, interviewers can instinctively navigate through the instrument and can easily use instruments for other surveys. Table 2 summarizes the components of a standard user interface.

Visual cues for interviewers include color coding of texts, having system messages appear in the same place all of the time. Blaise III gives the programmer control over the colors of messages, question texts, answer sets, and interviewer prompts. It also allows the programmer to choose where the questions and answer sets appear on the screen.

The Blaise III system allows the programmer to control the placement of question text, answer sets, and selected answers on the screen. The standard Blaise III data entry screen has one question on the top half of the screen and the answer set on the bottom half of the screen The selected answer appears near the bottom of the screen. By standardizing the placement of these three items, the instrument becomes easier to navigate. There are certain types of questions that are better formatted in other ways. For example, if the programmer wishes to store multiple answers to the same question in separate variables, then the separate variables can be placed at the bottom of the screen and the question text does not have to be repeated.

The same keyboard and mouse commands should be used throughout the survey instrument. For example, the keystrokes or mouse clicks for coding a "Don't Know" response or for moving from the current screen to the previous screen should not change from one part of the instrument to another. Although the programmer has the ability to change these keyboard and mouse commands, the benefits of a consistent user interface outweigh any benefits of changing these commands.

After a standard user interface has been developed and been implemented on several surveys, it is easy for the programmer and interviewing staff to create "rapid prototypes" of new survey instruments. Questions and logic for a new survey can be combined with the standard user interface to create a prototype of a new survey. The prototype will not provide the functionality of a completed system, but it will let the interviewers get a feel for the flow of the new survey and make suggestions for changes early on in the design cycle.

Monitoring interviews

Supervisors can monitor the performance of interviewers by the "silent monitoring" of their telephones and by viewing the interviewers' screens using monitoring software. The monitoring

software must be run over the network. The supervisor selects which computer station to monitor and then that computer station's video output is echoed to the supervisor's screen. There is no noticeable performance degradation noticed during this process if both parties are using 486 class machines.

Monitoring interviews is a valuable tool throughout the life of a study. During training, monitoring points out which areas of the interviewer's technique needs improvement. During the pilot phase of a survey, monitoring can give insight into ways of streamlining the survey and in providing more accurate answer sets. Interviewers may be hesitant to suggest changes to the way a survey "flows"; monitoring can illustrate these problems to the supervisor and the programmers. Similarly, programmers may not understand why something needs to change until they see how it works during an actual interview. During the active cycle of the survey, monitoring can be used as a powerful quality assurance control that scripts are being followed and that answers are being recorded correctly.

Hardware/software recommendations

The ATT telephone monitoring system has worked well for us in recent surveys. EXAC is the software package we have used to monitor screens.

Data/Metadata/Output Standards

Data standards

Standards are developing around the data base structures that are allowed, and encouraged, in the Blaise III system. The Blaise III system allows the use of data structures that functions as if they were relational data bases. Groups of questions can be defined into "blocks" that can be asked repetitively and dealt with as a unit. Also, the Blaise III system will let programmers specify up to two key fields (primary and secondary keys) to simplify data structures for longitudinal surveys. Table 3 summarizes the data standards described below.

A standard in data base design is evolving regarding the fields that the programmer includes in each "block", or group, of questions. The Blaise III system encourages the programmer to divide the survey questions into blocks in a number of ways. First, the data viewer tool in the Blaise III system allows supervisors to review data on a block level. Second, it is easier for supervisors to review data entered into the survey data bases if the data is divided by sections. When the data is divided this way, it takes a shorter period of time to locate data for a specific field. Supervisors are usually in a hurry to look at data; they normally view data to help set up an appointment or answer a question that an interviewer has during an actual interview. Finally, blocks of questions can be dealt with as a unit and can be used repetitively. The programmer can use these two facts to simplify the survey source code.

The data files that hold survey data in the Blaise III system are indexed on either a "primary key" field or on a combination of two "primary" and "secondary" key fields. The primary key is normally called "ID" in Blaise III programs. This field usually contains an arbitrary number that is associated with an individual subject in a survey. The Blaise III system contains a programming language, MANIPULA, that allows a programmer to output survey data into ASCII files, normally divided into "blocks" of questions. "Blocks" of questions usually correspond to sections in a survey.

These separate ASCII files can be read into a relational data base system and linked together by the primary key field "ID".

The "secondary" key is used when the same "blocks" of questions are asked repeatedly over a long period of time. For example, longitudinal surveys that ask the same "block" of questions at regular intervals can have dual keys, "ID" and "TIME_PERIOD". Take for example a survey which tracks one person's salary over a five month period. There are two methods of designing a data base structure to handle this problem. The two methods are outlined in Figure 1. The first method is to have a primary key field called "ID" and five fields called SALARY1--SALARY5. There is only one record per ID in this scenario. The question SALARY1 is asked in the first time period and the question SALARY2 is asked in the second time period, and so on. The data base structure can get quite long if, instead of just one question SALARY, there are 100 questions asked in each time period. The second method is to have a primary key called "ID", a secondary key called "TIME_PERIOD", and a third field called "SALARY". In this scenario, there will be five records for each ID. This places the data in a better format for analysis. In the second scenario, the field "SALARY" can be analyzed directly for the 5 records. In the first scenario, the 5 variables named SALARY1--SALARY5 must be recoded to a new analysis variable called SALARY before any statistics can be run on the data. The second scenario is also more flexible than the first scenario because in the first scenario, the programmer must know the exact number of iterations to copy each variable. If the survey goes beyond five time periods and the data base is designed to handle only five time periods, then there will be a problem. In the second scenario, the data base design is independent of the number of time periods the survey will be active.

Metadata Standards

The Blaise III survey development system is based on a fully-developed description of a survey called a "data model". The explicit description of the data model is called metadata. The Blaise III system defines metadata as a formal statement of the information used for collecting, processing, and publishing survey data. Four elements of the Blaise III system metadata are discussed here: data base structures, question texts, answer sets, and data dictionaries. Table 4 summarizes the metadata standards described below.

Data base structure development has been discussed earlier in this paper. The Blaise III system allows the programmer to access this information in a variety of ways. Perhaps the most useful way that the system presents the data base structure metadata is through the "structure viewer" tool of the Blaise III system. Figure 2 shows an example of the data base structure as presented by the structure viewer. Figure 2 shows the structure of the database on the "block" level to reveal the fields (questions) asked in the survey. Figure 3 shows the structure of one of the blocks "exploded". This is a very useful function during the development of a survey data base structure.

Question texts can be saved and used in more than one survey. The wording of questions is very precise in certain surveys. A programmer can keep a text file containing question texts that have been approved and use them whenever required. Table 5 shows an example of how question texts can be stored and used in multiple surveys.

Answer sets are just as important as the question texts in understanding survey data. There are multiple answer sets that can be applied to the same question. For example, certain scales and

lists are approved for use in different types of surveys. Table 6 presents an example of how answer sets can be stored and reused in multiple surveys.

The question texts and answer sets are important metadata used for understanding the data that is collected. The Blaise III system uses the question texts and answer sets when creating SAS programs to read survey data. The question texts are used as the variable LABELs in SAS and the answer sets are used as the SAS FORMATs.

The Blaise III system can generate data dictionaries that describe the questions and answer sets for surveys. The programmer has the ability to customize the data dictionary formats to suit the needs of the client sponsoring the survey. The data dictionary is particularly useful when used in conjunction with ASCII data files created from the proprietary Blaise III data files. In addition to the question text and answer sets, the data dictionary can list the position of each variable in the ASCII data file. The Blaise III provides a programming language for creating and modifying specifications for data dictionaries. Figures 5 and 6 show samples of Blaise III default data dictionaries.

Output Standards

The result of any survey is a series of documents describing the survey. These documents range from a paper copy of the survey to the collected data to descriptions of data.

This paper addresses six items that are becoming the standard deliverables to the sponsors of a survey: a paper copy of the survey, a data dictionary, an ASCII data set, a SAS source code file to read the ASCII data set, frequency distributions of analysis variables, and a memorandum explaining the details of the data set and variables and of any restructuring of the data that must be performed prior to data analysis. Table 7 lists and briefly describes these items and gives a figure reference for an example of the Blaise III system output.

A paper copy of the survey is important part of the output of a survey for obvious reasons. It allows current and future users of the survey data to see the exact context in which questions were asked. The prompts and notes that the interviewer supplies to each respondent influence the answers are provided. The Blaise III system allows the programmer to customize the standard survey printout format provided with the system. Figure 6 shows an example of the paper survey that the Blaise III system generates. The survey hardcopy is generated through the CAMELEON tool included with the Blaise III system.

Data dictionaries were discussed in the previous section of this paper. The Blaise III system allows the programmer to modify the default format of the data dictionaries provided by the system. Without any programming changes, the programmer can specify whether variables are identified by question number order or position in the ASCII data set. Figures 4 and 5 show examples of these two options, respectively. The data dictionaries are created through the CAMELEON tool included with the Blaise III system.

The Blaise III system will generate an ASCII data set of the survey data. The default is for all the data, including the call scheduler data, to be written to the ASCII data set. However, the programmer can easily define which variables are included. The ASCII data set is generated through the MANIPULA programming language included in the Blaise III system. Figure 7 shows an example of an ASCII data set generated by the Blaise III system.

The Blaise III system will generate a SAS source code program that will read in the ASCII data set generated through CAMELEON. Figure 8 displays a sample SAS source code that the Blaise III system creates. The SAS source code contains a FORMAT statement that uses the answer sets defined in the survey source code as the FORMATs for each variable. The SAS source code also contains LABELs for each variable. The LABEL is taken from the first 40 characters of the question texts as defined in the survey source code. Finally, the SAS source code contains an INPUT statement which contains the variable names, starting locations in the ASCII data set, and the ending locations in the ASCII data set.

Survey sponsors are very interested in examining the frequency distributions of all analysis variables as soon as the survey is completed. The Blaise III system provides a tool called ABACUS that can create frequency distributions on certain variables. SAS can generate frequency distributions very easily, also. Figure 9 contains an example of SAS frequency distributions created using the FORMAT and LABEL statements generated in the SAS source code described above.

The data base memorandum is the keystone of the survey output deliverables. It provides a brief description of the key fields of the data bases, a description of the relationship between the data bases (if there is more than one data set generated). For example, if the data is broken into separate data bases according to the different BLOCKs of the survey, tell which field relates the data bases together. A table listing the number of variables and the number of records in the data files is usually included in this memorandum.

Conclusion

Surveys are increasing in complexity due to the availability of survey management systems such as Blaise III. The standards evolving around systems, data, and metadata are being driven by cutting-edge systems like Blaise III. The key to providing quality documentation to these surveys is using the metadata provided by the survey management systems.

Table 1. Hardware and Monitoring Standards

Component	**Standard**
Platform for Blaise III	Local area network
Interviewer computer station	486, 8MB RAM, VGA monitor, keyboard, mouse, no hard disk, connected to network
Telephone station	head-piece, "silent monitoring" enabled, forward calls to station
Fax station	located near interviewer station
Monitoring	telephone syste with "silent monitoring", software to view computer screens over the network

Table 2. User Interface Components

Component	**Example**
Color coding texts	Prompts in red, probes in green
Placement of system messages	Always in upper right hand corner
Placement of question texts and answers	Questions in top half of screen, answers in bottom half of screen
Consistent use of "hot keys"	F5= Don't Know, F6=Refuse
Leaving section of survey	Require a value of '1' to be entered, not pressing the ENTER key
Mouse use	Click left button to select, click right button to escape
Exiting survey instrument	Allow exit from only one segment of survey, user's must "jump" to this section

Table 3. Data Standards

Component	**Standard**
Data base structure	Relational, primary or secondary keys
Name of primary key	"ID"
Longitudinal surveys	Primary key "ID" for subject, secondary key "TIME_PERIOD" for time period
Question organization	"BLOCK" organization, acts as a unit, can be used repetitively

Table 4. Metadata Standards

Component	**Standard**
Data base structures	"BLOCK" orgainization, primary key, primary and secondary key for longitudinal surveys
Question texts	Store and resuse, can associate with multiple answer sets
Answer sets	Store and reuse, can associate with multiple question texts
Data dictionaries	Question number, position in ASCII data set, question texts, answer sets

Table 5. Reusing Question Texts

ID	Question Text	Answer Set IDs
Q1	"What is the age of your spouse?"	AGE_TYPE, SPOUSE_AGE
Q2	"What is your monthly income?"	INCOME_RANGE, 0..10,000
Q3	"What is the age of your child?"	AGE_TYPE, 0..85

Table 6. Reusing Answer Sets

ID	Answers	Question IDs
AGE_TYPE	15-20 21-30 31-40 41-50 51-60 >60	Q1 (Age of spouse) Q3 (Age of child)
SPOUSE_AGE	15-25 26-35 36-45 46-55 >55	Q1 (Age of spouse)
INCOME_RANGE	0 - 250 251- 500 501- 750 751-1000 >1000	Q2 (Monthly income)

Table 7. Checklist of Items Deliverable to Survey Sponsor

Item	**Description**	**Blaise III Standard Example**
Paper copy of survey	Question texts, answer sets	Figure 8
Data dictionary	Variable names, question texts, answer sets, placement in ASCII data files	Figures 4 and 5
ASCII data set	Survey data written to ASCII data set	Figure 7
SAS code to read ASCII data set	FORMAT, LABEL, INPUT sections of DATA Step	Figure 8
Frequency distributions on all analysis variables	SAS frequency distributions	Blaise III does not generate; Figure 9
Data base memo	Number of observations, number of variables, instructions on how to use the data	Blaise III does not generate

Figure 1. Longitudinal Study Data Base Designs

Option 1 Primary Key Only

ID (Primary Key)	**SALARY1**	**SALARY2**	**SALARY3**	**SALARY4**	**SALARY5**
001	975	975	1000	950	975
002	500	600	575	625	900

Option 2 Primary and Secondary Key

ID (Primary key)	**TIME_PERIOD (Secondary key)**	**SALARY**
001	1	975
001	2	975
001	3	1000
001	4	950
001	5	975
002	1	500
002	2	600
002	3	575
002	4	625
002	5	900

Figure 2. Data Base Structure as Presented by Blaise III Viewer

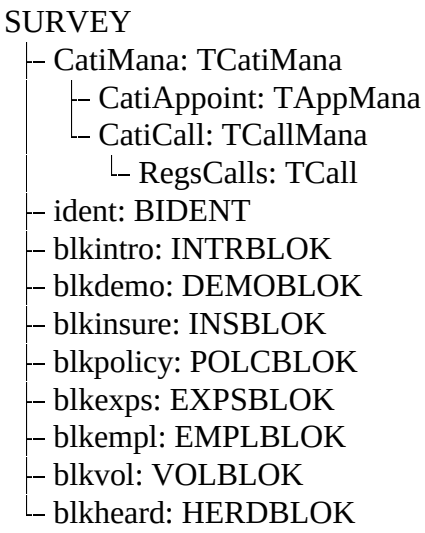

Figure 3. Blaise III Data Dictionary - Variables Shown with Question Numbers

Number	Questionname Answers	Questiontext Answertexts
1	AppointType	"When can we call you back ?"
	NoPreference	1 "no preference"
	CertainDate	2 "appointment for date and time"
	Period	3 "preference for a period"
	DayOfWeek	4 "preference for days of the week"
2	DateStart	"start date "
	Date type	
3	TimeStart	"start time "
	TimeType	
4	DateEnd	"end date "
	Date type	
5	TimeEnd	"end time "
	TimeType	
6	WeekDays	"selected weekdays"
	Sunday	1
	Monday	2
	Tuesday	3
	Wednesday	4
	Thursday	5
	Friday	6
	Saturday	7

Figure 4. Blaise III Data Dictionary - Variables Shown with Question Numbers

Number	Questionname / Answers	Questiontext / Answertexts
1	AppointType	"When can we call you back ?"
	NoPreference	1 "no preference"
	CertainDate	2 "appointment for date and time"
	Period	3 "preference for a period"
	DayOfWeek	4 "preference for days of the week"
2	DateStart	"start date "
	Date type	
3	TimeStart	"start time "
	TimeType	
4	DateEnd	"end date "
	Date type	
5	TimeEnd	"end time "
	TimeType	
6	WeekDays	"selected weekdays"
	Sunday	1
	Monday	2
	Tuesday	3
	Wednesday	4
	Thursday	5
	Friday	6
	Saturday	7

Figure 5. Blaise III Data Dictionary -
Variables Shown with Position in ASCII Set

Position		Question Name / Answers	Question Text / Answer texts
1 -	1	AppointType	"When can we call you back ?"
		NoPreference	1 "no preference"
		CertainDate	2 "appointment for date and time"
		Period	3 "preference for a period"
		DayOfWeek	4 "preference for days of the week"
2 -	9	DateStart	"start date "
		Date type	
10 -	17	TimeStart	"start time "
		TimeType	
18 -	25	DateEnd	"end date "
		Date type	
26 -	33	TimeEnd	"end time "
		TimeType	
34 -	34	WeekDays	"selected weekdays"
		Sunday	1
		Monday	2
		Tuesday	3
		Wednesday	4
		Thursday	5
		Friday	6
		Saturday	7

Figure 6. Example of Survey Hard Copy

QUESTIONNAIRE: SURVEY

29-02-1996 14:23

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1. What is the ID of the case?
   (Enter text of at most 3 characters) ___

2. CHILDHOOD INJURY STUDY@/ @/TELEPHONE INSTRUMENT 1@/ @/Good (morning\afternoon\evening). This is (INTERVIEWER'S NAME) calling from the East Coast Institute on Public Health about our survey on child safety both in and out of the home. A few weeks ago we called and talked with $LCONTACT about the $LAGE year old child that lives in your home.@/@/First, I need to speak with the person most likely to know about your $LAGE year old child's daily child care arrangements and use of medical care. [NOTE: THIS WILL BE THE CONTACT PERSON. IF CONTACT PERSON IS NOT AVAILABLE, ARRANGE A CALL BACK TIME.] @/@/[PRESS ENTER TO CONTINUE].
   (Enter text of at most 1 characters)

_

3. @/May I please have your $LAGE year old's name because I will be referring to him or her during our conversation?@/
   (Enter text of at most 40 characters)

Questions 4 through 7 :
(Circle proper code)

		YES	NO
4.	(1) @/Is $LCHILD wheelchair dependent?@/	1	2
5.	(2) @/Does $LCHILD have a chronic disease that keeps (him\her) from being as active as other children (his\her) age?@/ 1 2		
6.	(3) @/Does $LCHILD have a serious developmental delay or abnormality?@/	1	2
7.	(4) @/Does $LCHILD have any other serious illness or condition?@/	1	2

Figure 7. Example of ASCII Data Set Generated by Blaise III

```
001  122          2
004  112 1132     2
006  111 1132     2
007  112 1132     2
009  122          2
010  122          2
012  122          12                                                  13132
013  122          2
015  122          2
016  122          14fish                                              10132
017  122          2
018  122          2
020  11212132     2
021  111 1112     2
023  122          2
026  112 1132     2
029  122          2
030  121 1132     2
032  122          2
034  122          14fish                                               1122
035  112 1132     11                                                   8132
037  122          2
040  121 1132     11                                                   11313
041  112 1132     2
043  121 1132     2
044  122          2
046  122          2
048  112 5132     2
049  122          2
050  112 7132     2
052  122          2
054  121 1132     2
056  122          2
057  122          2
060  122          2
061  112 1132     2
062  112 1132     2
063  111 1132     11                                                  13132
066  111 1132     2
067  122          2
```

Figure 8. Example of SAS Source Code Generated by Blaise III

```
TITLE 'SURVEY';

PROC FORMAT;

VALUE TYPE_1F
  1='Sunday'
  2='Monday'
  3='Tuesday'
  4='Wednesday'
  5='Thursday'
  6='Friday'
  7='Saturday'
;
RUN;

DATA FILE;
INFILE 'C:SURVEY.A00' LRECL = 3219;
INPUT
    AppointT      1 -    1
    DateStar $    2 -    9
    TimeStar     10 -   17
    DateEnd $    18 -   25
    TimeEnd      26 -   33
    WeekDay1     34 -   34
    WeekDay2     35 -   35
    WeekDay3     36 -   36
    WeekDay4     37 -   37
    WeekDay5     38 -   38
    WeekDay6     39 -   39
    WeekDay7     40 -   40
;

LABEL
  AppointT   = 'When can we call you back ?'
  DateStar   = 'start date '
  TimeStar   = 'start time '
  DateEnd    = 'end date '
  TimeEnd    = 'end time '
  WeekDay1   = 'selected weekdays'
  WeekDay2   = 'selected weekdays'
  WeekDay3   = 'selected weekdays'
  WeekDay4   = 'selected weekdays'
  WeekDay5   = 'selected weekdays'
  WeekDay6   = 'selected weekdays'
  WeekDay7   = 'selected weekdays'
;
```

Figure 8. Example of SAS Source Code Generated by Blaise III (cont.)

```
FORMAT
  AppointT  TYPE_2F.
  WeekDay1  TYPE_1F.
  WeekDay2  TYPE_1F.
  WeekDay3  TYPE_1F.
  WeekDay4  TYPE_1F.
  WeekDay5  TYPE_1F.
  WeekDay6  TYPE_1F.
  WeekDay7  TYPE_1F.
;

RUN;
```

Figure 9. Example Frequency Distribution of Analysis Variable by SAS

FREQUENCY DISTRIBUTION OF SURVEY DATA

What percentage of the students are female?

GENDER	Frequency	Percent	Cumulative Frequency	Cumulative Percent
10 % OR LESS	45	23.0	45	23.0
MORE THAN 10 %,	38	19.4	83	42.3
MORE THAN 25 %,	44	22.4	127	64.8
MORE THAN 50 %,	39	19.9	166	84.7
MORE THAN 75 %	27	13.8	193	98.5
DON'T KNOW	1	0.5	194	99.0
REFUSED	2	1.0	196	100.0

Frequency Missing = 208